Mod. TB3D/TB4D

DeviceNet

FIELDBUS

MODULE

FOR

PNEUMATIC

MANIFOLD

VALVES

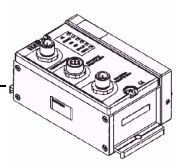
&

I/O SIGNAL

- *Industry standard connection M8-M12-M23-7/8"*
- *Integrated connection to manifold valves - ISO VDMA & Compact Series*
- *24 coils valves capability*
- *Auxiliary max capability of 64digital input + 40digital output*
- *Optical & via network Diagnostic Monitor*
- *IP 65 protection grade*

Automation

rev.04a8



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Every conceivable measure has been taken to ensure the correctness and completeness of this documentation. However, as errors can never be fully excluded we would appreciate any information or ideas at any time.

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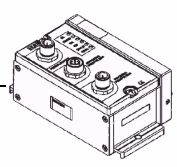
We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally trademark or patent protected.



Important note

To ensure fast installation and start-up of the units described in this manual, we strongly recommend that the following information and explanations are carefully read and abided by.

Personnel Qualification

The use of the product detailed in this manual is exclusively geared to specialists having qualifications in PLC programming, electrical specialists or persons instructed by electrical specialists who are also familiar with the valid standards. UNIVER S.p.A. declines all liability resulting from improper action and damage to UNIVER S.p.A. products and third party products due to non-observance of the information contained in this manual.

Intended Use

For each individual application, the components supplied are to work with a dedicated hardware and software configuration. Modifications are only permitted within the framework of the possibilities documented in the manuals.
All other changes to the hardware and/or software and the non-conforming use of the components entail the exclusion of liability on part of UNIVER S.p.A.
Please direct any requirements pertaining to a modified and/or new hardware or software configuration directly to UNIVER S.p.A.

Safety Notes

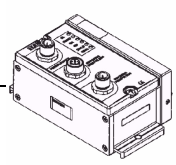
Attention
Switch off the system prior to working on bus modules!
In the event of deformed contacts, the module in question is to be replaced, as its functionality can no longer be ensured on a long-term basis.

ESD (Electrostatic Discharge)
The modules are equipped with electronic components that may be destroyed by electrostatic discharge. When handling the modules, ensure that the environment (persons, workplace and packing) is well grounded. Avoid touching conductive components, e.g. gold contacts.

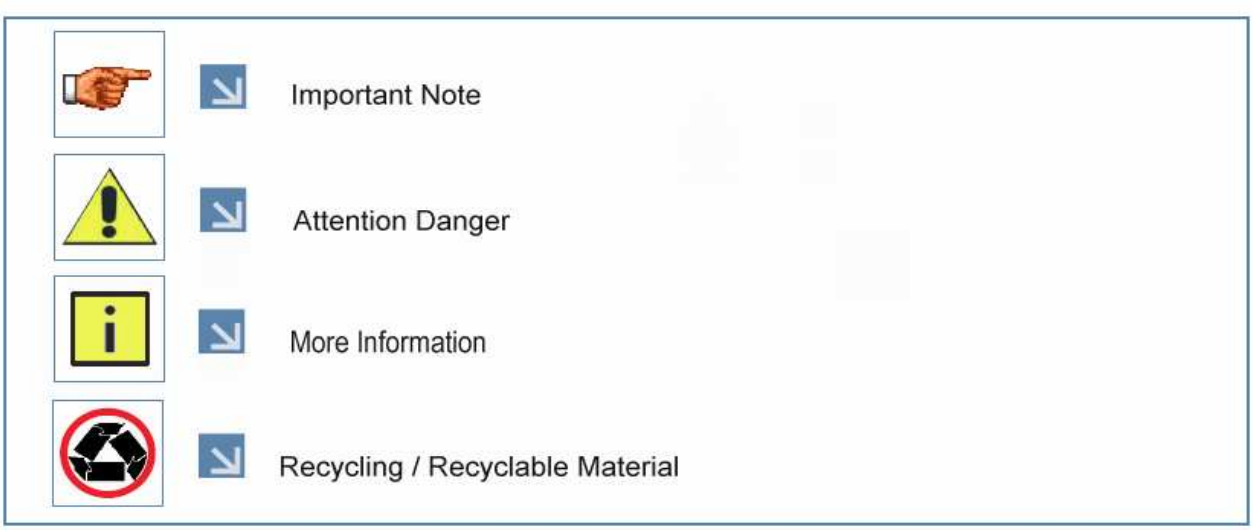
Abbreviation

DI Digital Input
DO Digital Output
I/O Input/Output
ID Identifier
HW Hardware
SW Software
LSB Least Significant Digit
MSD Most Significant Digit
VLS24 Logic & Sensor power supply
VA24 Auxiliary Output power supply

Follow the instructions of this present manual



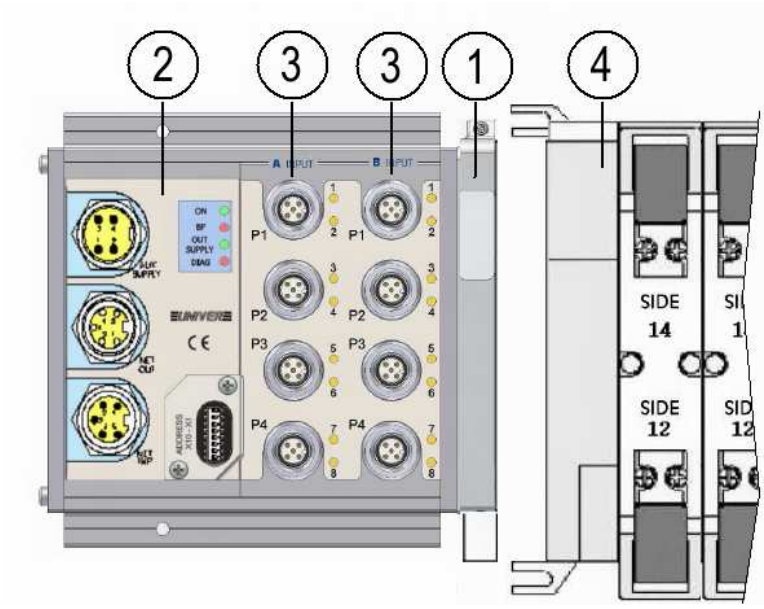
Legend of Symbols

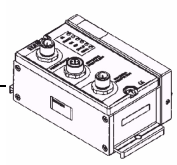


System Descripiton

TB3D/TB4D is a single block slave device for controlling manifold valve, digital input and output which use ***DeviceNet*** fieldbus interface.

The system structure here described consists of an MANIFOLD OUTPUT INTERFACE (1), of an FIELDBUS module (2) of an AUXILIARY DI/DO modules (3).
the manifold valves (4) completes the system.

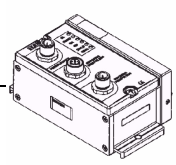




Module Specifications

FieldBus Data	
Bus Input Connector	*Circular 7/8 Male 5 pins*
Bus Output Connector	*Circular 7/8 Female 5 pins*
Bus Function Displays	*Module Status_red-green* *NETWORK Status_red-green*
Auxiliary Function display	*Output Supply_green* *Input Supply_green* *Diag_red*
Address Slave	*Switchable 00 to...63*
Communication Rate	*125K,250,500K (AutoBode)*
FieldBus Connection Mode	*Group 2 only-Polled-COS-Cyclic*
EDS Filename	TxxD3_3xxxx.EDS
Module part code	***TB3D*** *(ISO VDMA 18)* ***TB4D*** *(ISO VDMA 26)*
FieldBus Device Name-Code / File / Producer	*AnyBus-IC 61 / ABIC DEV 301 / HMS Industrial NetworkS AB*
Electrical Data	
Auxiliary output & Input Supply connector	*Circular 7/8 Male 4 pins*
Logic Voltage Supply VL24	*24 Vdc +/- 20%*
Logic Nominal Current VL24	*100mA*
Digital Input Voltage Supply VS24	*24 Vdc +/- 25%*
Digital Inputs Current VS24	*1.2A @ 20°C - overload protected (20mA per input)*
Output voltage Supply VA24	*24 Vdc +/- 15% (valves coil range)*
Output Current VA24 (all output)	*2,5A max - overload protected*
Output Manifold Valves Capability	*24 coil max - (12 bistable valves - 1,5A per 12 coils)*
Auxiliary Digital I/O Capability	*max 56 digital I/O (7 auxiliary module)*
Auxiliary Digital Output Capability	*max 40 digital output (5 auxiliary module)*
Auxiliary Digital Input Capability	*max 56 digital input (7 auxiliary module)*
Environmental Conditions	
weight	*370g*
Dimentions	*85 x 123 x 75 mm*
MTBF - Mean Time Between Failures	*197.359 Hours* *50°C*
Protection Degree	*IP 65* *IEC 60529*
Relative humidity	*5 to 85%* *IEC 60068-2-30*
Operating Temperature	*5°C ÷ 50°C* *IEC 60068-2-1*
Storage Temperature	*-25°C ÷ 80°C* *IEC 60068-2-2*
Vibration	*5g tested 10-500Hz* *IEC 60068-2-6*
Shock operating	*22g peak* *IEC 60068-2-27*

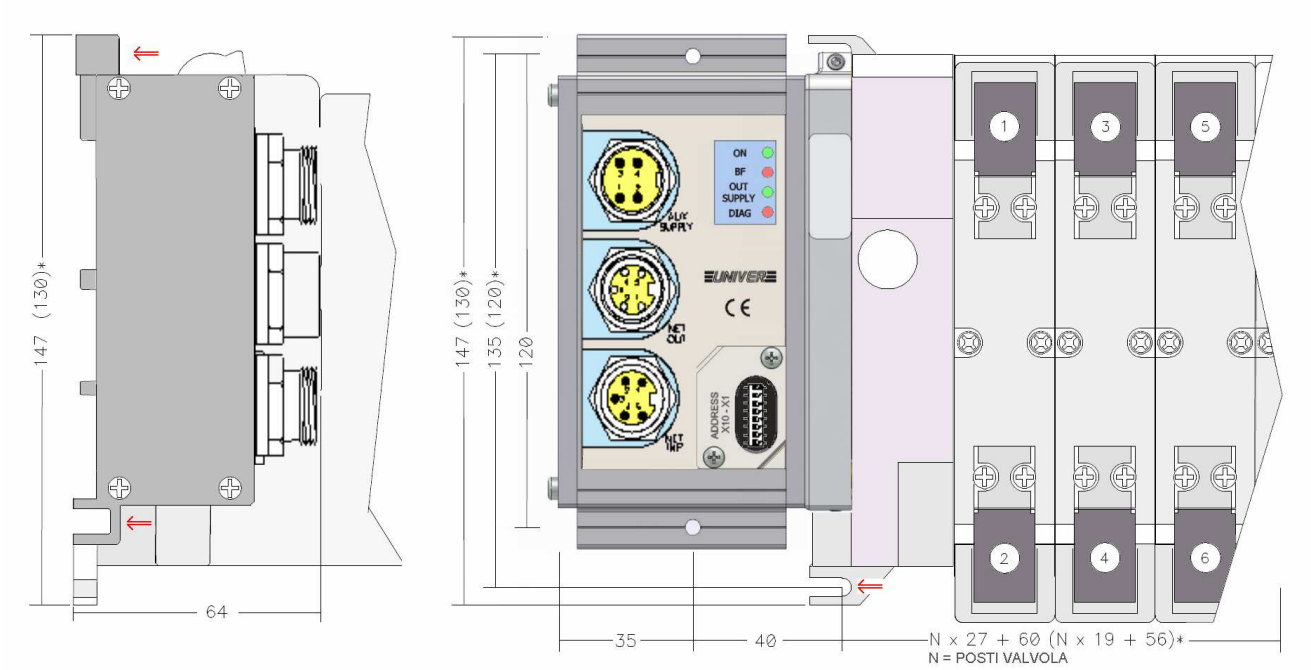
Please to take in consideration the consumption parameters when selecting power supply unit



Module installation

Before installing the module, verify that all its parts are intact and have not been damaged during transport, pay attention to the overall dimentions.

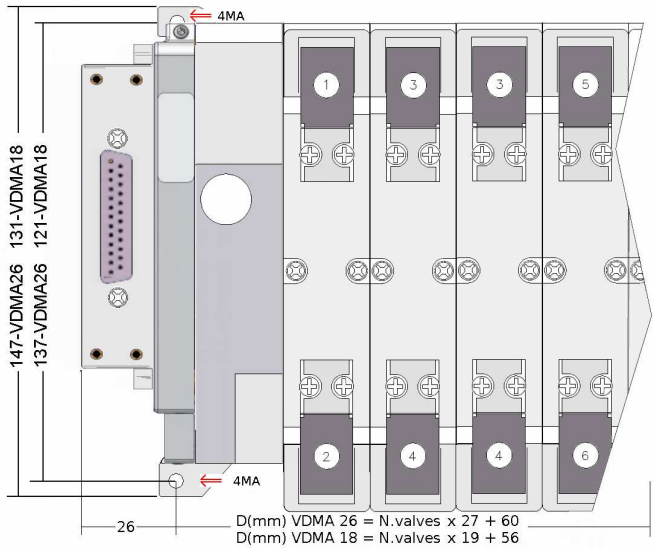
We do recommend to fix the device in the specified hole with M4 screws on a single metal surface to grant a good ground connection

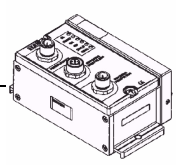


Dimentions change according to the numbers of I/O auxiliary module used (max 7)

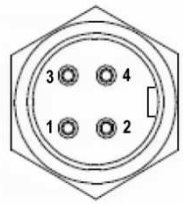
The overall length changes according to the numbers of the auxiliary I/O modules used and manifold valves type & configuration.

ISO VDMA manifold dimentions



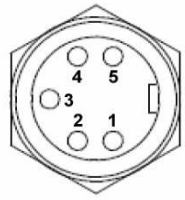


Connectors pin assignement

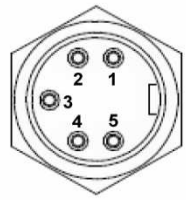


Aux Supply
pin assignament
7/8 " 4 pins
Power supply (MALE)
Looking into pins

Pin	Function
1	VA24
2	NC
3	NC
4	0VA



DeviceNet
pin assignament
7/8 " 5 pins
Bus Out (FEMALE)
Looking into socket



Bus In (MALE)
Looking into pins

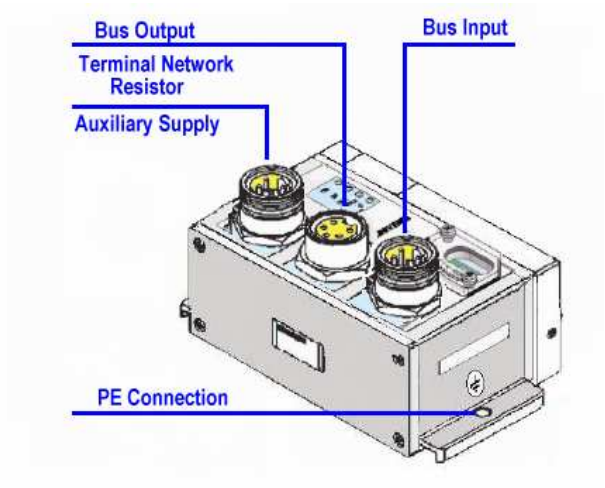
Pin	IN OUT
1	Drain
2	VLS24
3	0V
4	CAN - H
5	CAN - L

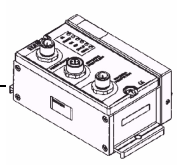
System supply connection

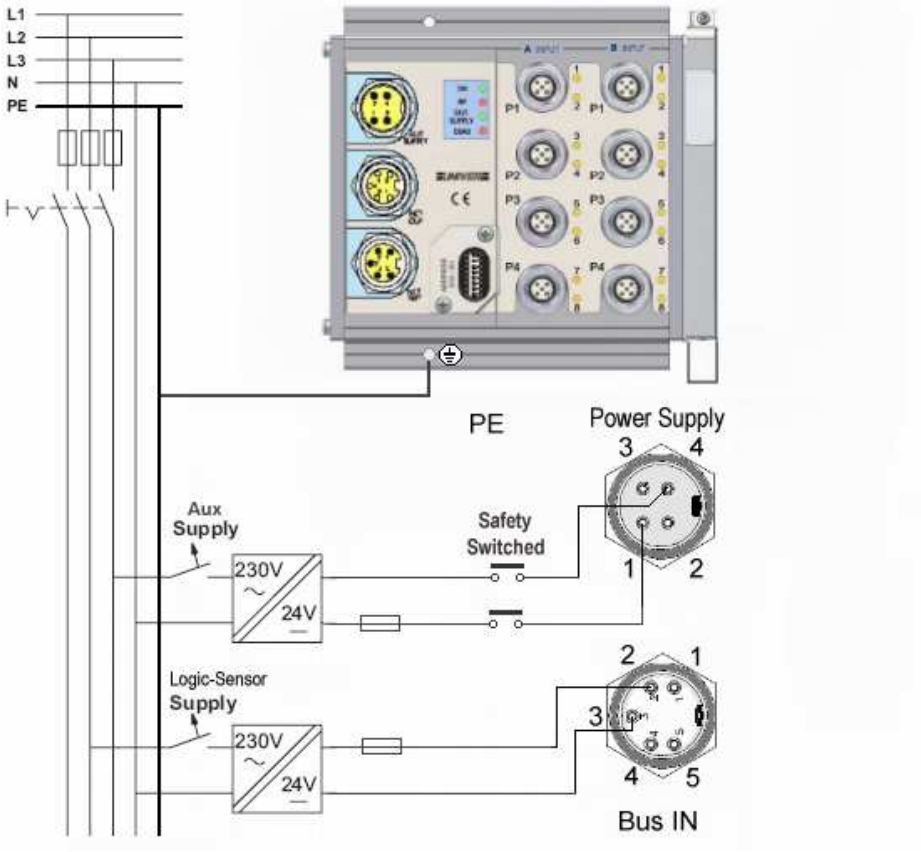
Connect the module to the appropriate DeviceNet network cable

The PE connection has to be connected externally to the ground

We recommend to fix the device in the specified hole with M4 screws on a single surface to grant a good ground connection







The fieldbus module requires a dual power supply:

VLS24 (24Vdc) for the Logic & Sensor supply

VA24 (24Vdc -10%+15%) for output and manifold valves.

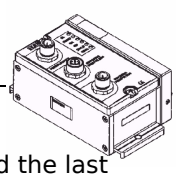
Supply Example

Network configuration

DeviceNet specifications defines for a maximum network distances the main trunk line and drop lines. Maximum distances depend on the baud rate used on the network:

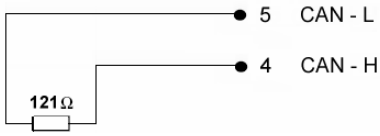
Baud Rate	Trunk Line Length		Drop Length			
	Maximum Distance		Maximum		Cumulative	
	Meters	Feet	Meters	Feet	Meters	Feet
125k baud	5OO m	164O ft	6 m	2O ft	156 m	512 ft.
25Ok baud	25O m	82O ft	6 m	2O ft	78 m	256 ft.
5OOk baud	1OO m	328 ft	6 m	2O ft	39 m	128 ft.

Network Terminator



A *DeviceNet* system must be terminated at each end of the trunk line. The host controller and the last slave on the network must always be terminated to eliminate reflections, even if only two nodes are present.
The DeviceNet specifications for the terminating resistor are:

- 121 ohm
- 1% metal film
- ¼ Watt



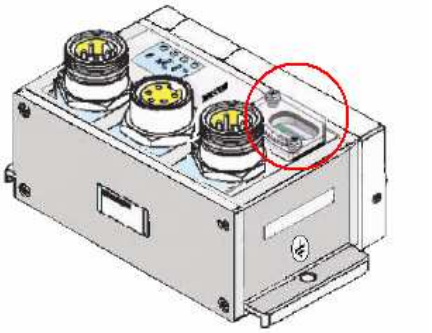
Per the DeviceNet spec. do not terminate devices on drop lines.

EDS file specification

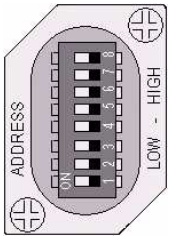
EDS is an abbreviation of Electronic Data Sheet. EDS file contains the device description and provide for an open configuration tool while reading the device information and recognizing the device characteristics.

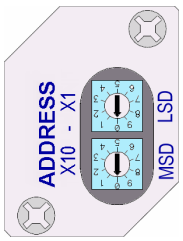
How to Set the Module Address

Max Valid Node Address are **01** to **63**
Each module is delivered set for node address **63**
The Dip or Rotary switches, are located
on the top panel.



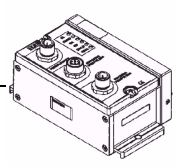
Dip Switch ON	8	7	6	5	4	3	2	1
Address Slave			ON	ON	ON	ON	ON	ON
Com.Rate 125 Kbps								
Com.Rate 250 Kbps		ON						
Com.Rate 500 Kbps	ON							





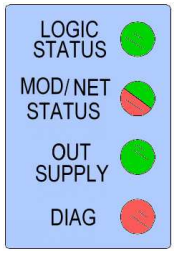
Rotary Switch	MSD	LSD
Address Slave	X10 ***M**ost **S**ignificant **D**igit*	X1 ***L**east **S**ignificant **D**igit*
Max add.	9	9

To set the address, remove the cover, tourn rotary switch to the desired address, tourn OFF the device and then tourn ON again
(The address is read only at power up)
Remember to close the cover cap again to guarantee the protection degree



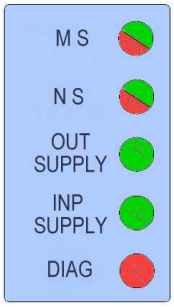
Local Diagnostic and Status indicators

Combined
Led function

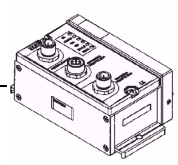


Des.	Color	Meaning
LOGIC STATUS	Green **OFF**	Logical Supply NO present
	Green **ON**	Logical Supply present
MOD/ NET STATUS	Green **OFF**	Not ON line
	Green **ON**	ON line Connected
	Green **FLASH**	ON line NO Connected
	Red **ON**	Unrecoverable fault
	Red **FLASH**	Recoverable fault
OUT SUPPLY	Green **OFF**	Output Supply NO present
	Green **ON**	Output Supply present
INPUT SUPPLY	Green **OFF**	Input Supply NO present
	Green **ON**	Input Supply present
DIAG	Red **OFF**	Output Protection NO active
	Red **ON**	Output Protection active Input Output Supply NO present

Double
Led function



Module Status MS	Green **OFF**	No power
	Green **ON**	Normal Operating
	Red **ON**	Unrecoverable fault
	Red **FLASH**	Recoverable fault
Network Status NS	Green **OFF**	No power
	Green **ON**	ON line Connected
	Green **FLASH**	ON line NO Connected
	Red **ON**	Critical link failture
	Red **FLASH**	Connection timeout



Output Manifold valves consumes-reception data.

Coil *Position*	Valve *Function*	Byte-Bit *Consumes*
1	side 14	O - O
2	side 12	O - 1
3	side 14	O - 2
4	side 12	O - 3
5	side 14	O - 4
6	side 12	O - 5
7	side 14	O - 6
8	side 12	O - 7
9	side 14	1 - O
10	side 12	1 - 1
11	side 14	1 - 2
12	side 12	1 - 3

Coil *Position*	Valve *Function*	Byte-Bit *Consumes*
13	side 14	1 - 4
14	side 12	1 - 5
15	side 14	1 - 6
16	side 12	1 - 7
17	side 14	2 - O
18	side 12	2 - 1
19	side 14	2 - 2
20	side 12	2 - 3
21	side 14	2 - 4
22	side 12	2 - 5
23	side 14	2 - 6
24	side 12	2 - 7

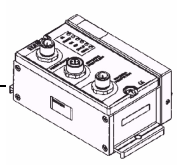
The manifold digital output valves use always 24 Bit(3 Byte).

Auxiliary Digital OUTPUT (max 5 modules) consumes-reception data.

Slot Position	*Connection* Port-Pin	Byte-Bit *Consumes*
A	P1-4	3 - O
	P1-2	3 - 1
	P2-4	3 - 2
	P2-2	3 - 3
	P3-4	3 - 4
	P3-2	3 - 5
	P4-4	3 - 6
	P4-2	3 - 7
C	P1-4	5 - O
	P1-2	5 - 1
	P2-4	5 - 2
	P2-2	5 - 3
	P3-4	5 - 4
	P3-2	5 - 5
	P4-4	5 - 6
	P4-2	5 - 7
E	P1-4	7 - O
	P1-2	7 - 1
	P2-4	7 - 2
	P2-2	7 - 3

Slot Position	*Connection* Port-Pin	Byte-Bit *Consumes*
B	P1-4	4 - O
	P1-2	4 - 1
	P2-4	4 - 2
	P2-2	4 - 3
	P3-4	4 - 4
	P3-2	4 - 5
	P4-4	4 - 6
	P4-2	4 - 7
D	P1-4	6 - O
	P1-2	6 - 1
	P2-4	6 - 2
	P2-2	6 - 3
	P3-4	6 - 4
	P3-2	6 - 5
	P4-4	6 - 6
	P4-2	6 - 7
E	P3-4	7 - 4
	P3-2	7 - 5
	P4-4	7 - 6
	P4-2	7 - 7

The maximum auxiliary digital output configurable are 40 Bit(5 Byte).

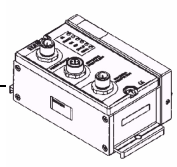


Auxiliary Digital INPUT (max 8 modules) produces-transmission data.

Slot *Position*	*Connection* *Port-Pin-Function*	Byte-Bit *Assignement*
A	P1-4 P1-2	O - O O - 1
	P2-4 P2-2	O - 2 O - 3
	P3-4 P3-2	O - 4 O - 5
	P4-4 P4-2	O - 6 O - 7
C	P1-4 P1-2	2 - O 2 - 1
	P2-4 P2-2	2 - 2 2 - 3
	P3-4 P3-2	2 - 4 2 - 5
	P4-4 P4-2	2 - 6 2 - 7
E	P1-4 P1-2	4 - O 4 - 1
	P2-4 P2-2	4 - 2 4 - 3
	P3-4 P3-2	4 - 4 4 - 5
	P4-4 P4-2	4 - 6 4 - 7
G	P1-4 P1-2	6 - O 6 - 1
	P2-4 P2-2	6 - 2 6 - 3
	P3-4 P3-2	6 - 4 6 - 5
	P4-4 P4-2	6 - 6 6 - 7

Slot *Position*	*Connection* *Port-Pin-Function*	Byte-Bit *Assignement*
B	P1-4 P1-2	1 - O 1 - 1
	P2-4 P2-2	1 - 2 1 - 3
	P3-4 P3-2	1 - 4 1 - 5
	P4-4 P4-2	1 - 6 1 - 7
D	P1-4 P1-2	3 - O 3 - 1
	P2-4 P2-2	3 - 2 3 - 3
	P3-4 P3-2	3 - 4 3 - 5
	P4-4 P4-2	3 - 6 3 - 7
F	P1-4 P1-2	5 - O 5 - 1
	P2-4 P2-2	5 - 2 5 - 3
	P3-4 P3-2	5 - 4 5 - 5
	P4-4 P4-2	5 - 6 5 - 7
H	P1-4 P1-2	7 - O 7 - 1
	P2-4 P2-2	7 - 2 7 - 3
	P3-4 P3-2	7 - 4 7 - 5
	P4-4 P4-2	7 - 6 7 - 7

The maximum auxiliary digital input configurable are 64 Bit(8 Byte).



Auxiliary Digital I/O Modules Specifications

The auxiliary inputs and outputs modules use 5 pins M12 female connectors.
Every module controls 8 signals, 2 signals for M12 connector.

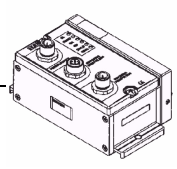
Input Module Specification	
Part Code	**TB8I412H**
Termination type	*Circular 4 x M12*
Input per Module	*8*
Switching Logic	*2 or 3 wire PNP devices*
Operating Voltage Supply ***VS24***	*24V dc+/- 25%*
Power dissipation max per module	*0,18W*
Sensor Source Current per input	*20mA*
Signal logic "OFF"	*0V dc to 5V dc*
Signal logic"ON"	*13V dc to 30V dc*
Typical input Current ON state max	*5mA*
Typical input Current OFF state max	*1,1mA*
Nominal Ipedence	*5Kohm*
Delay Time ON to OFF	*1mS*
Status Display	*Valid Input – yellow indicator ON*

Output Module Specification	
Part Code	**TB8U412H**
Termination type	*Circular 4 x M12 size*
Output per module	*8*
Switching Logic	*Sourcing Output*
Output Voltage Supply ***VA24***	*24 V dc +/- 15% (valves coil range)*
Power dissipation max per module	*1,8W*
ON state Current per Output	*0.3A*
ON state Surge Current per Output 10mS	*0.7A*
Overload protected per Output	*0.7-1.7A*
Module Current rating max	*2.5A* **(1)**
Status Display	*Energized Output – yellow indicator ON*

Environmental Conditions		
weight	*70g*	
Overall Dimentions	*30 x 123 x 75 mm*	
Protection Degree	*IP 65*	*IEC 60529*
Relative humidity	*5 to 85%*	*IEC 60068-2-30*
Operating Temperature	*5°C ÷ 50°C*	*IEC 60068-2-1*
Storage Temperature	*-25°C ÷ 80°C*	*IEC 60068-2-2*
Vibration	*5g tested 10-500Hz*	*IEC 60068-2-6*
Shock operating	*22g peak*	*IEC 60068-2-27*

(1) Max current value for all system outputs, calculate derating factor for multiple output modules.

Make sure all connectors and caps are securely tightened to properly seal the connections against leaks and maintain IP65 requirements. I/O cable length should be less than 10 meters



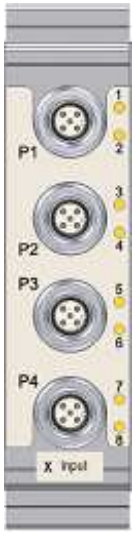
Auxiliary Digital I/O Modules Connection

COD.**TB8I412**
N.8 Digital Input - M12

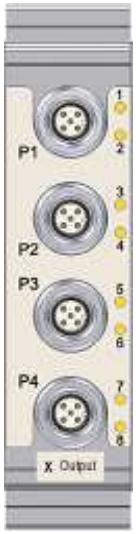
COD.**TB8U412**
N.8 Digital Output - M12

Input / Output
M12 (Female)
Looking into sockets

Pin	IN	OUT
1	VS24	NC
2	INP 2	OUT 2
3	0VAS	
4	INP 1	OUT 1
5	SHIELD	



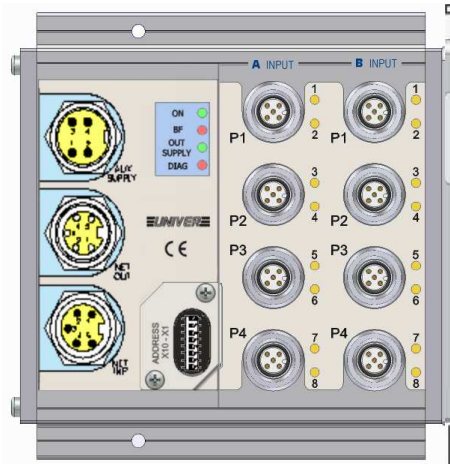
TB8I412H

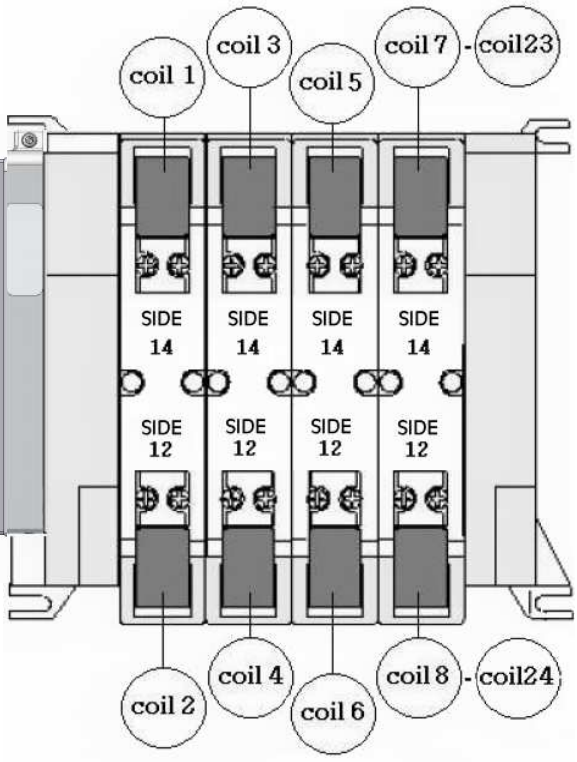


TB8U41H

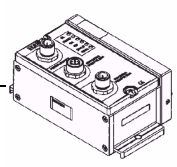
Valves Coil Slot Allocation

SLOT **A** SLOT **B**





Each added Input modules increasse proportionally Input Byte assignement.
Each added Output modules increases proportionally Output Byte assignement.

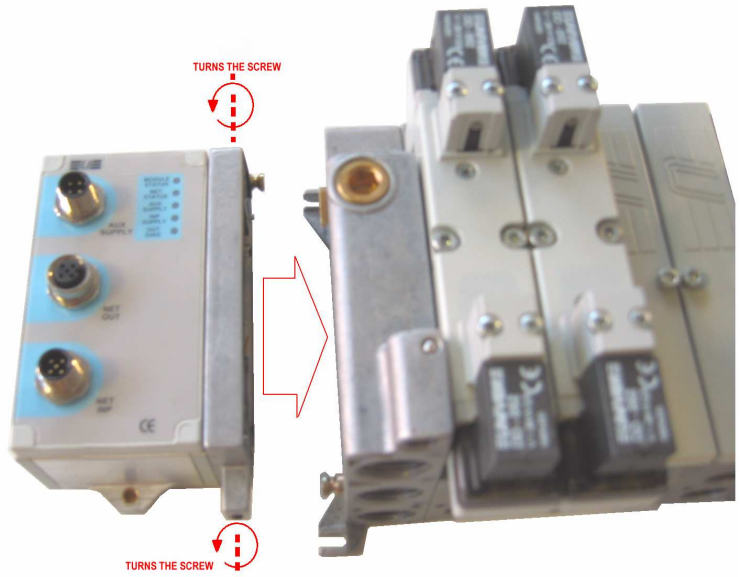


Identification Label

Assembly FieldBus Module to ISO VDMA Manifold Valves Assembly

Insert the FieldBus Module to the Manifold valves making attention to the connector pin

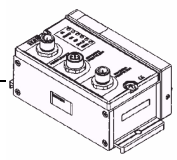
Subsequently turns the screw



FieldBus Accessories ordering code

	Code	Description	Size	Protection Degree
	TZ-CN4MC	DeviceNet (4-pins, female) AUX SUPPLY	7/8	IP65
	TZ-F578	DeviceNet (5-pins, female)	7/8	IP65
	TZ-M578	DeviceNet (5-pins, male)	7/8	IP65
	TZ-M578T	DeviceNet (5-pins, male) Network termination (120ohm)	7/8	IP65

Additional accessories for connecting can be found on www.univer-group.com webside



Conformity Declaration

Univer S.p.A. declares under the own responsibility that the Device in object is in compliance with the EMC directive 89/336/EEC, with amendaments for 92/31/EEC and 93/68/EEC through conformance whith the following Harmonised European standards:

Date:	9 Luglio, 2007	**Harmonised European standards:**
Device:	Multi I/O Pneumatic Device	EN 61000-4-3 (1996) EN 61000-4-6 (1996)
Term:	TB3D/TB4D	EN 61000-4-2 (1996) EN 61000-4-4 (1996)
Manufacturer:	Univer S.p.A. Via Eraclito, 31 20128 Milano ITALY tel. +39 02252981 fax. +39 0225298310	EN 61000-4-5 (1995) EN 61000-4-6 (1996) EN 61000-4-8 EN 61000-4-11 EN 61000-6-2 (1995) EN 61000-6-4 (1993)

CE

R&D Manager signature: _____

Dangers and residual risks

There aren't residual risks that may cause damage to the health of the person exposed. In case of maintenance, the operator is alerted by a visual sign placed near the high-risky areas, where there could be voltage dangers.

Dangers Caused by Improper use

It is recommended to use only original spare parts. They are to be considered including the "misuse conditions " of any modifications or changes of any kind, that the user arbitrarily.

Correct and Incorrect Use

The FieldBus Slave control unit, in all its models can be used only as reported on the operative manual manufacturer. The requirements of security and reliability of the unit are guaranteed only by using original components.

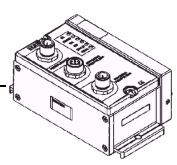
Frequency of programmed maintenance

The unit was designed and built so as not to require a specific scheduled maintenance.

Instructions regarding removal / elimination of waste materials

If you wont to disassemble the unit is necessary to observe some basic rules to safeguard the health and the environment.

Cables, liners and plastic components, must be disposed separately from all other materials
The metal parts must be grouped by type of material.



Fieldbus ordering string definition

TB	X	D	00	00

SERIES

TB	ISO VDMA Manifold plugin & I/O module
TM	Multibus M23 connector standard
TS	Only I/O module

SIZE

3	ISO VDMA 18mm size
4	ISO VDMA 26mm size

FIELDBUS

C	**CANopen**	64+64 I/O
D	***DeviceNet***	64+64 I/O
I	**INTERBUS S**	32+32 I/O
P	**PROFIBUS dp**	64+64 I/O

AUXILIARY DIGITAL INPUT

N° 08-16-24-32-40-48-56-64

AUXILIARY DIGITAL OUTPUT

N° 08-16-24-32-40-48-56-64